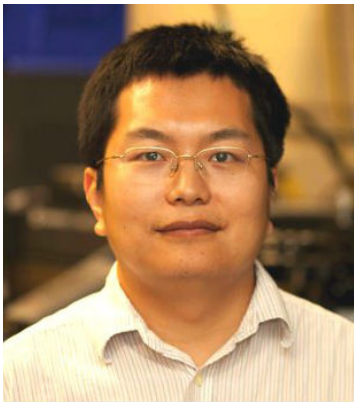


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## Optoelectronics of 2D Materials



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Abstract:

Electronic valleys are extrema of Bloch energy bands in momentum space. Having multiple valleys gives the electron states pseudospin degrees of freedom in addition to their real spin. In this talk, I will discuss our experimental progress on the investigation of spins and pseudospins using atomically thin semiconductors, which are either single or bilayer group VI transition metal dichalcogenides [1-3]. These new 2D semiconductors behave as remarkable excitonic systems, providing an exciting laboratory for optical, electrical and magnetic control of the valley degrees of freedom. I will also discuss strong coupling effects between spin, valley, and layer pseudo-spins in bilayers, which lead to spin polarization in electronic bands in the presence of bulk inversion symmetry and allow electrical control of spin states. I will conclude the talk with the discussion of spatially indirect exciton properties in monolayer semiconducting heterostructures [4] and single quantum emitters in monolayers [5].

Tues Nov 25, 2014  
Room 6-120  
OPEN TO ALL

- References: [1] Xu et al., Nature Physics 10, 343(2014),  
[2] Jones et al., Nature Nanotechnology 8, 634-638 (2013),  
[3] Aivazian et al., <http://arxiv.org/abs/1407.2645>,  
[4] Rivera et al., <http://arxiv.org/abs/1403.4985>.  
[5] He et al., <http://arxiv.org/abs/1411.2449>.